Iron King Mine - Humboldt Smelter Superfund Site

Community Meeting
April 27, 2010

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

ADEQ Arizona Department of Environmental Quality

Agenda

6 – 6:50 **EPA Presentation**

- Remedial Investigation Results
- Superfund Process
- Next Steps
- Community Involvement

6:50 - 7:00 **ADEQ and University of Arizona Presentations**

7:00 - 7:30 **Questions and Answers**

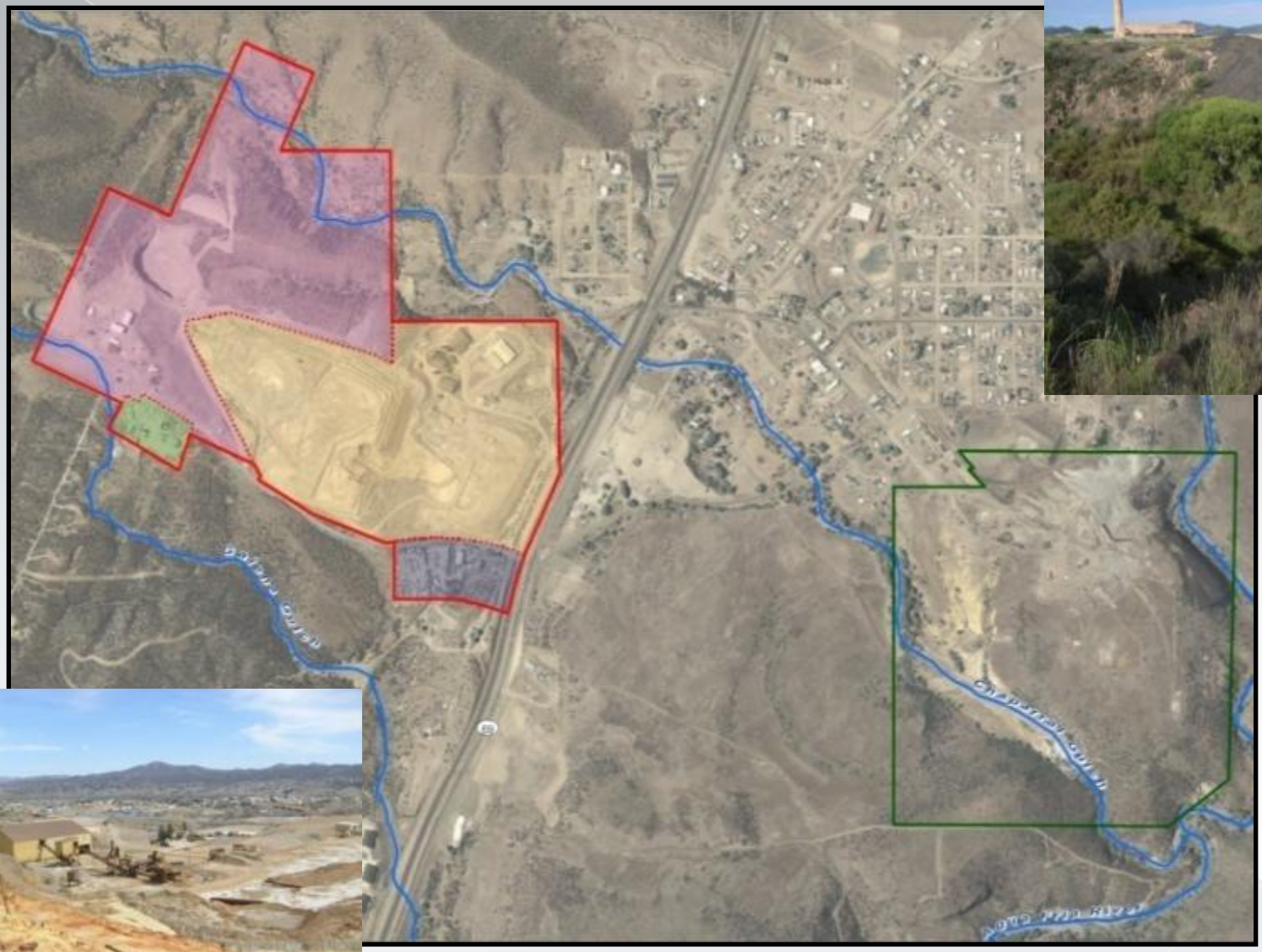
7:30 - 8:30 **Break and Open House**

- Poster Viewing
- Staff available for one-on-one discussions

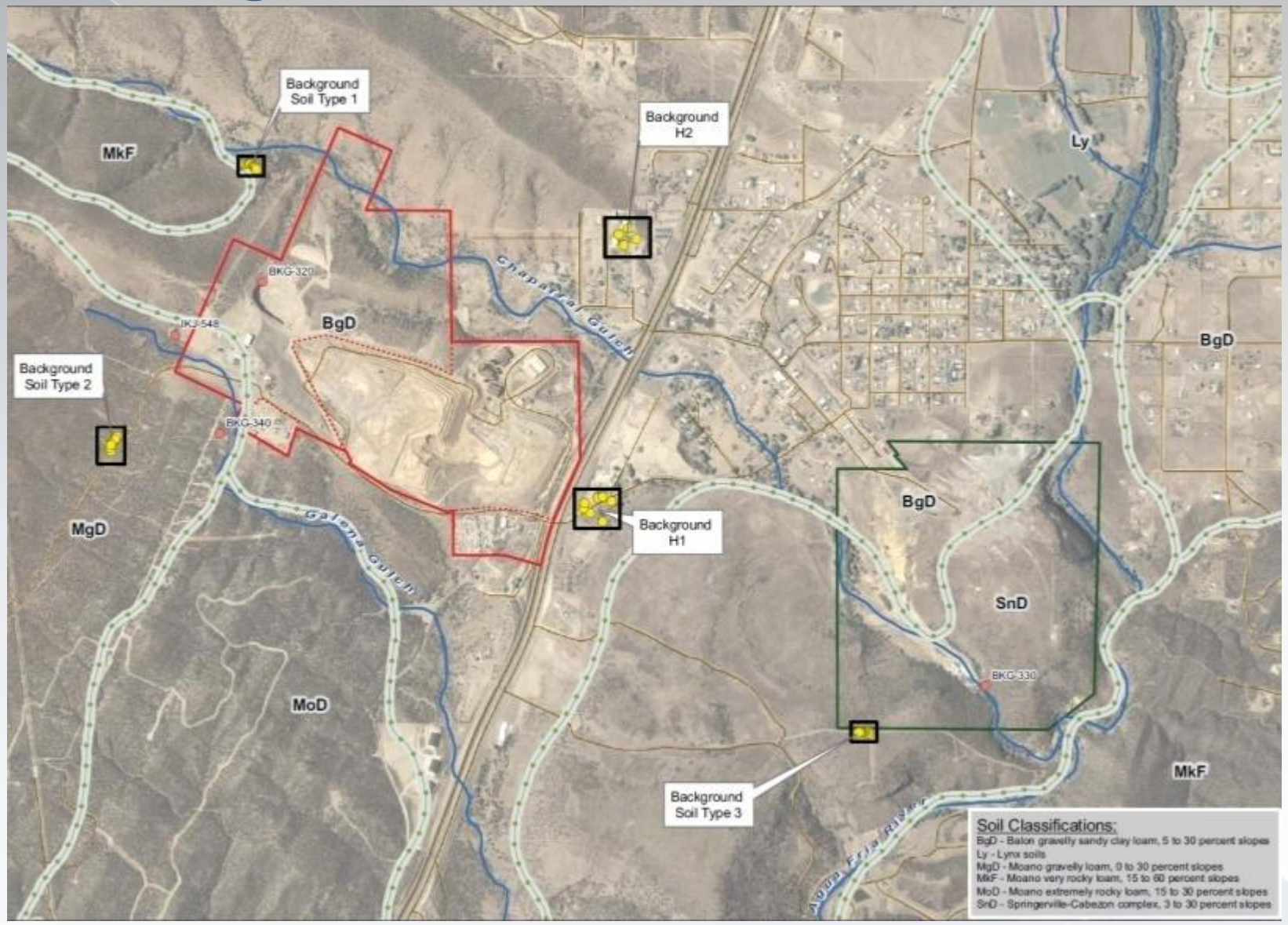
Introductions

- **EPA**
  - Leah Butler, Project Manager
  - David Cooper, Community Involvement Coordinator
- **ADEQ**
  - Brian Stonebrink, Project Manager
  - Joellen Meitl, Project Hydrogeologist
  - Felicia Calderon, Community Involvement Coordinator
- **Technical Support**
  - Doug McReynolds, EA Engineering, Science, and Technology
- **University of Arizona**

Background



Background Evaluation



Background Evaluation

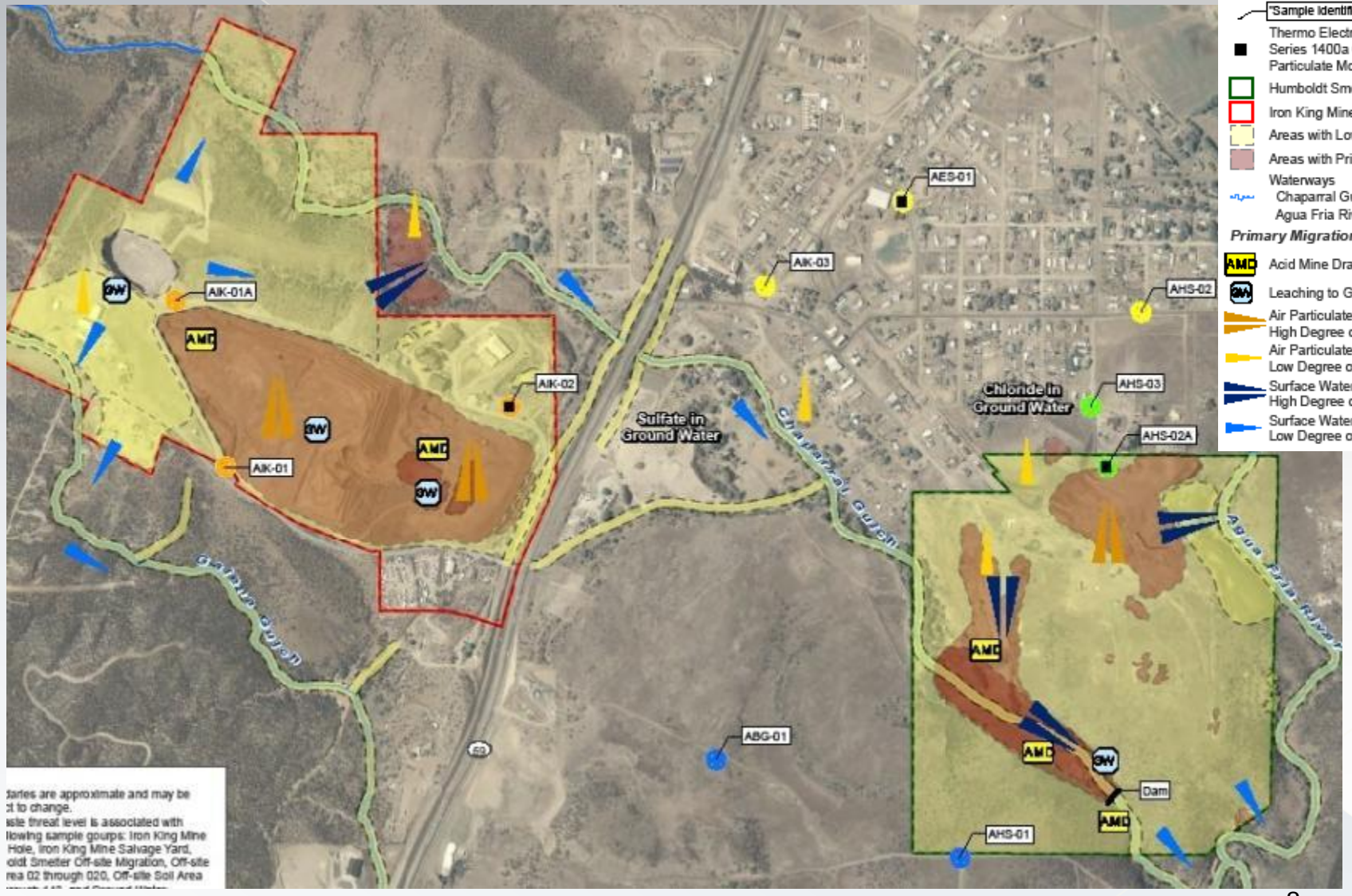
Soil Type	Average Arsenic (ppm)	Average Lead (ppm)
Background Soil Type 1	**48**	**79**
Background Soil Type 2	13	10
Background Soil Type 3	12	13
EPA Screening Level	0.39/22	400
AZ Soil Remediation Level	10	400

- EPA is collecting more background samples to verify concentrations in Soil Type 1, numbers may change.

Source Areas

- Contain high levels of contamination
  - Chemicals of Concern: arsenic, lead, sulfate
- Contamination can move to other areas
  - Residential neighborhood
  - Groundwater aquifer
  - Rivers and gulches
- Mechanisms for migration
  - Air
  - Surface Water
  - Groundwater

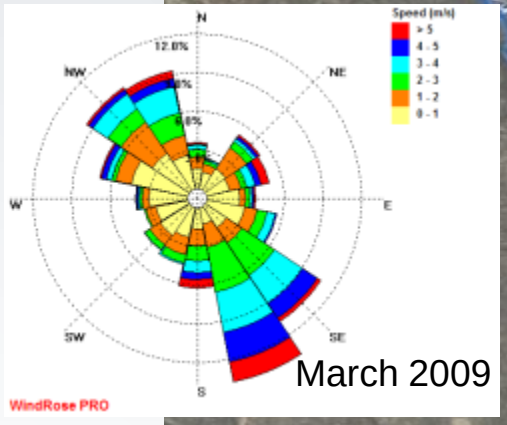
Source Areas



Primary Source Areas

Source Area	Avg. Arsenic (ppm)	Avg. Lead (ppm)
Iron King Mine Impoundment	4,430	3,830
Iron King Mine Main Tailings Pile	3,100	2,380
Humboldt Smelter Tailings Pile	1,320	577
Small Tailings Pile	572	683
Lower Chaparral Gulch	370	454
Humboldt Smelter Ash Pile	167	822
Humboldt Smelter Impoundment	45.3	561
Background	48	79
EPA Screening Level	0.39/22	400
AZ Soil Remediation Level	10	400

Air Sampling



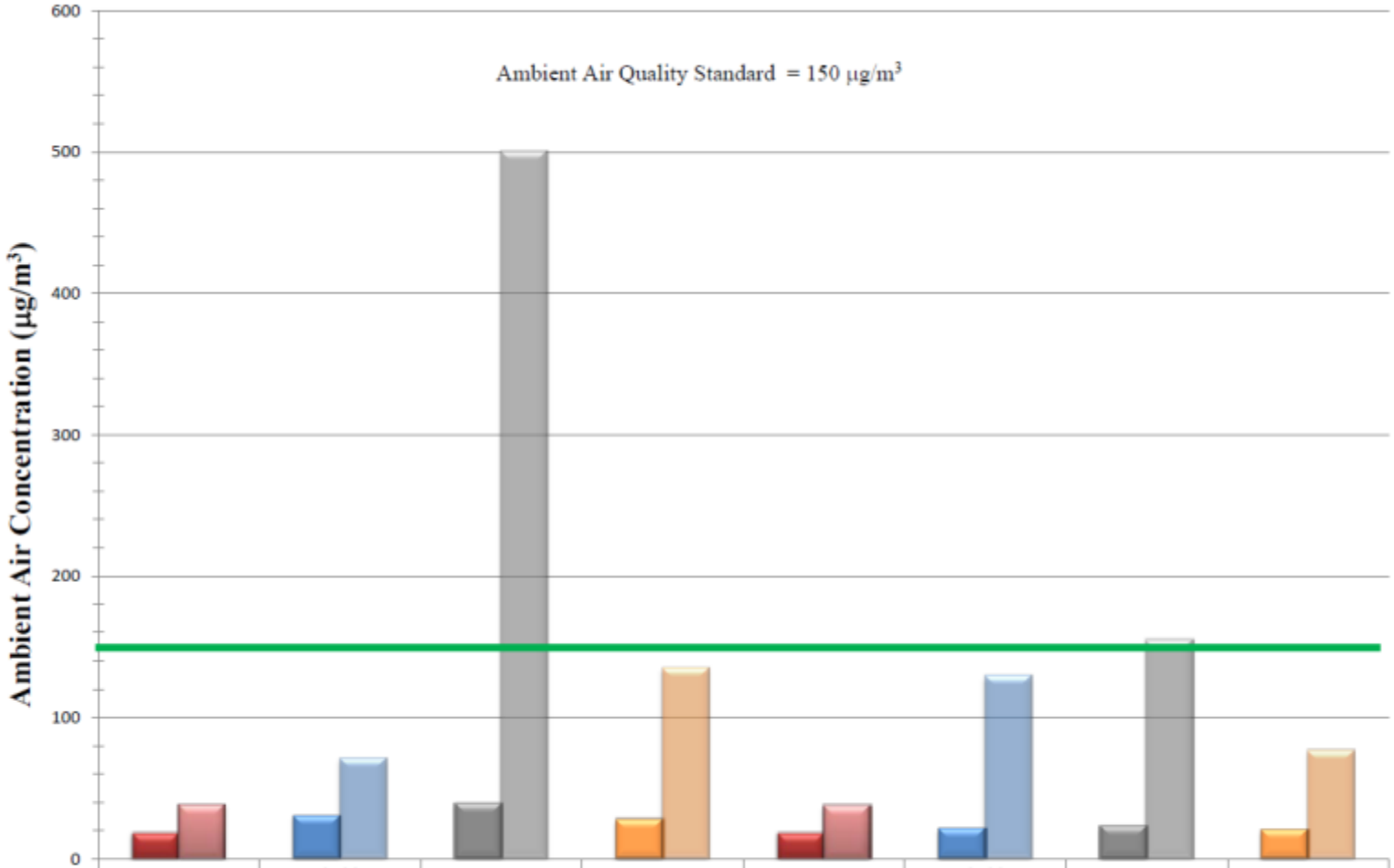
Dust in Air

- Peak dust events
  - March, April, July, August
  - Peak dust events correlate with high wind speeds

- Short duration:
  4 to 8 hours

Dust in Air

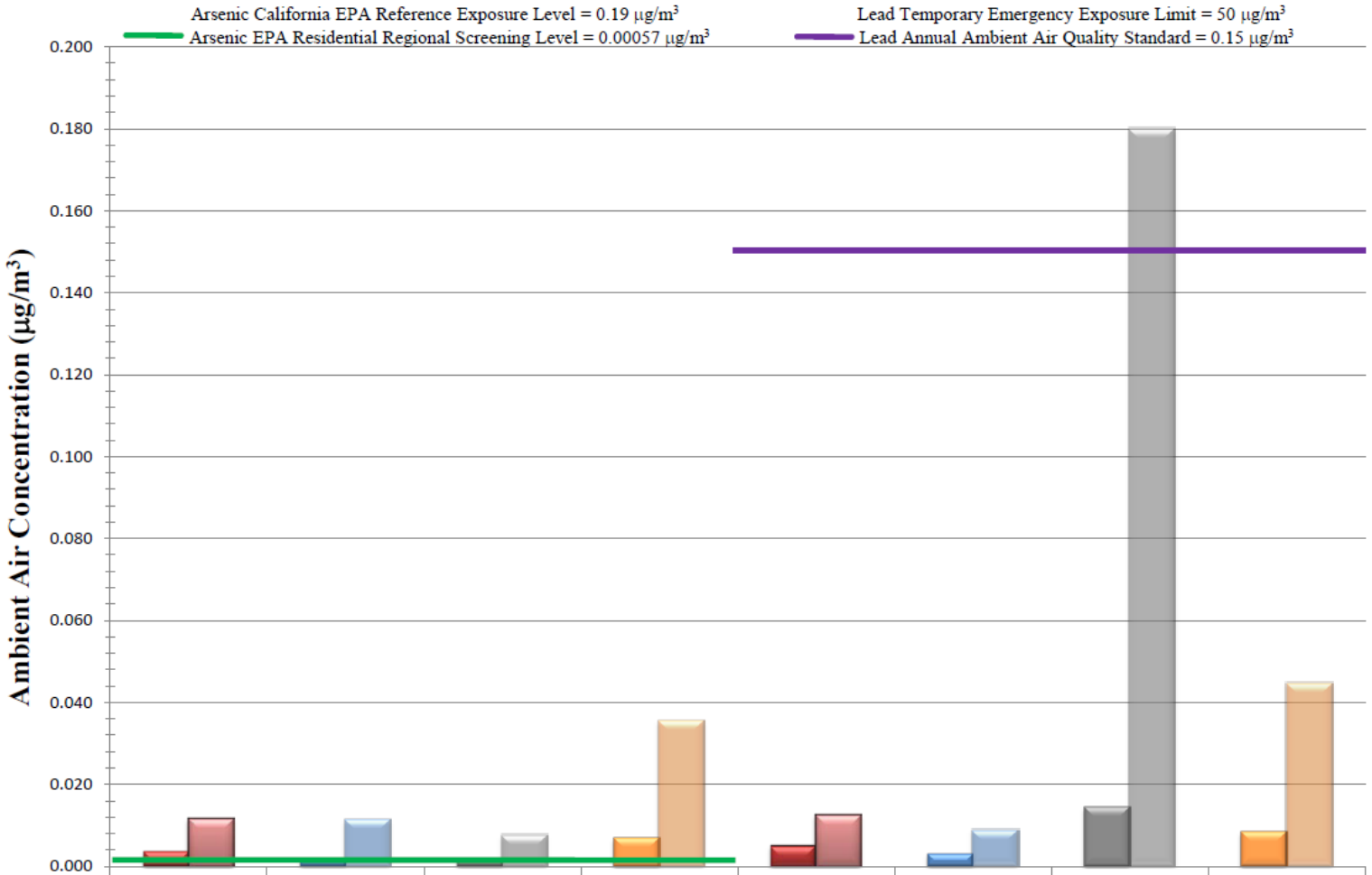
Figure 5-66 - Particulate Ambient Air Concentrations



	Total Suspended Particulates				Particulate Matter < 10 Microns			
	Background	Humboldt - In Town	Humboldt Smelter	Iron King Mine	Background	Humboldt - In Town	Humboldt Smelter	Iron King Mine
Mean	18	30	39	28	18	21	23	20
Max	38	71	500	135	37	129	155	77

Metals in Air

Figure 5-67 - Arsenic and Lead Ambient Air Concentrations



	Arsenic				Lead			
	Background	Humboldt - In Town	Humboldt Smelter	Iron King Mine	Background	Humboldt - In Town	Humboldt Smelter	Iron King Mine
Mean	0.0035	0.0018	0.0018	0.0069	0.0050	0.0030	0.014	0.008
Max	0.012	0.011	0.0075	0.035	0.012	0.0087	0.18	0.045

Waterways

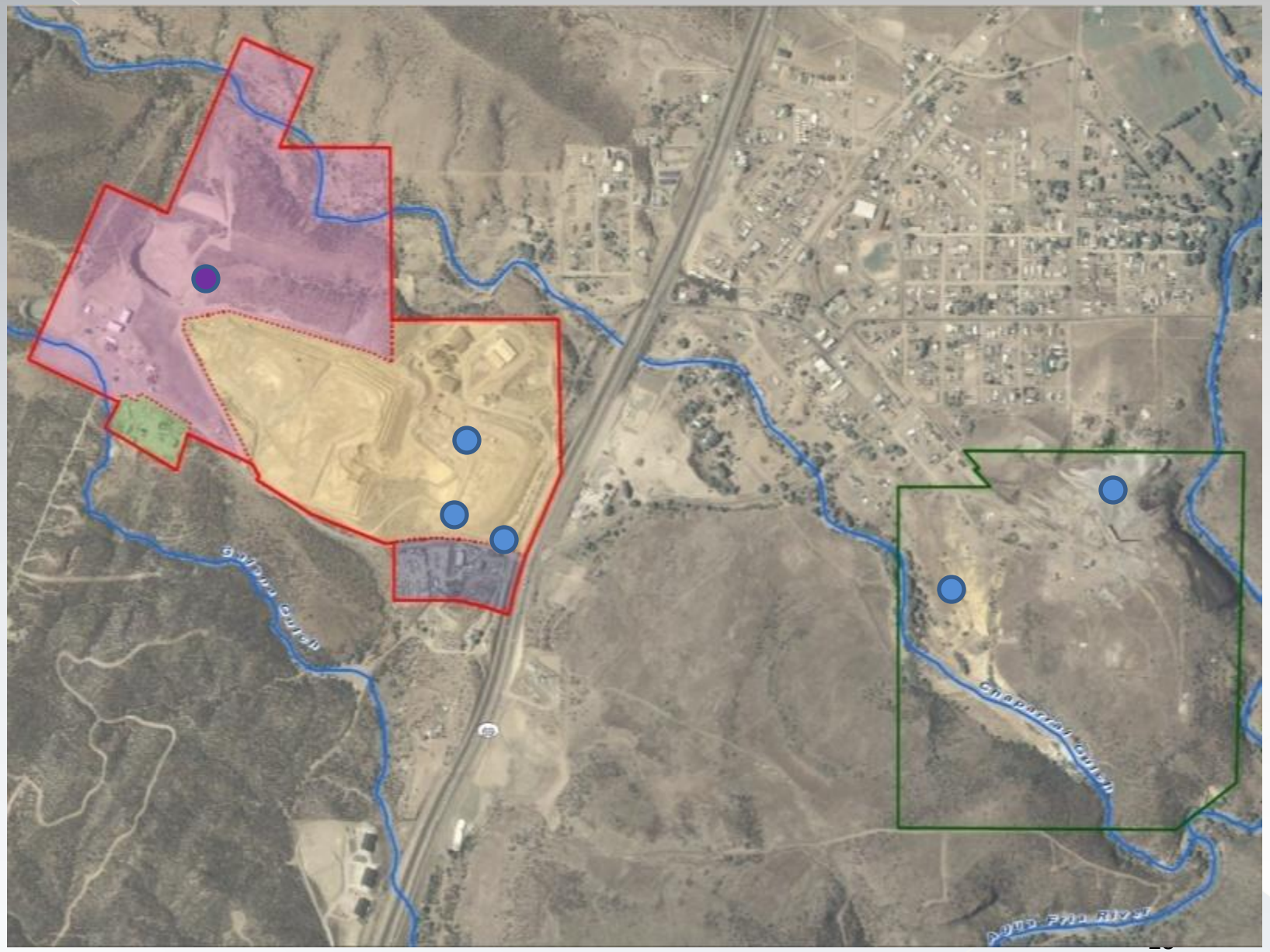
	Soil or Sediment (ppm)	
	Avg. Arsenic	Avg. Lead
Lower CG	370	454
Middle CG	204	241
Upper CG	130	146
Agua Fria River	92.9	349
EPA Screening Level*	0.39/22	400
AZ Soil Remediation Level*	10	400

*Human Health screening levels.

Agua Fria River

Chaparral Gulch

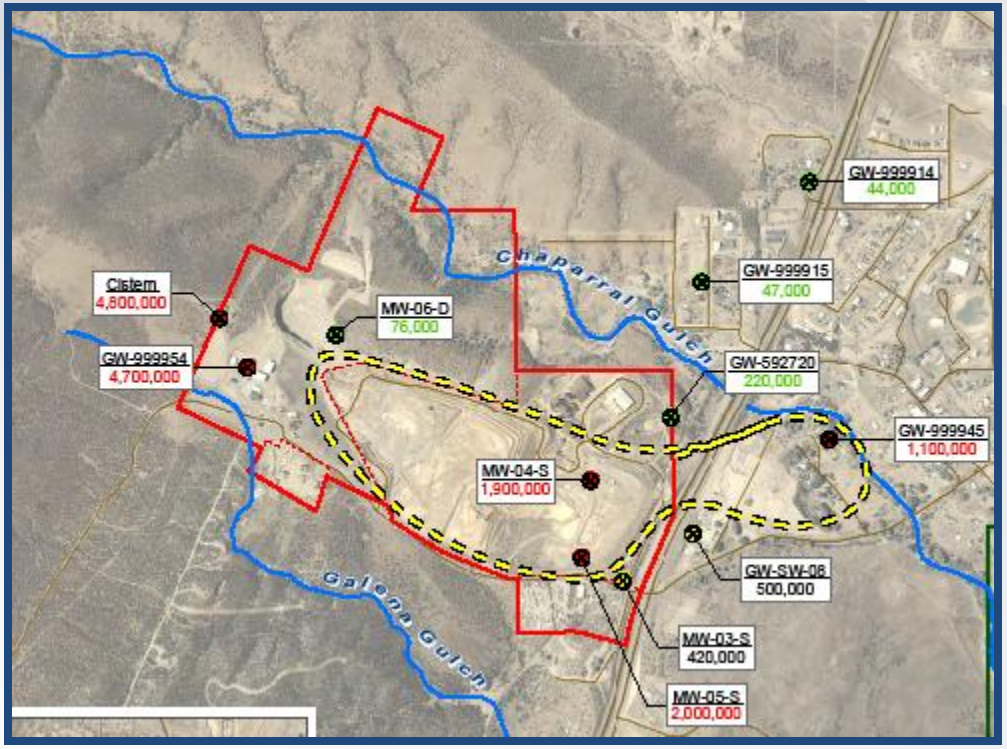
Groundwater Wells



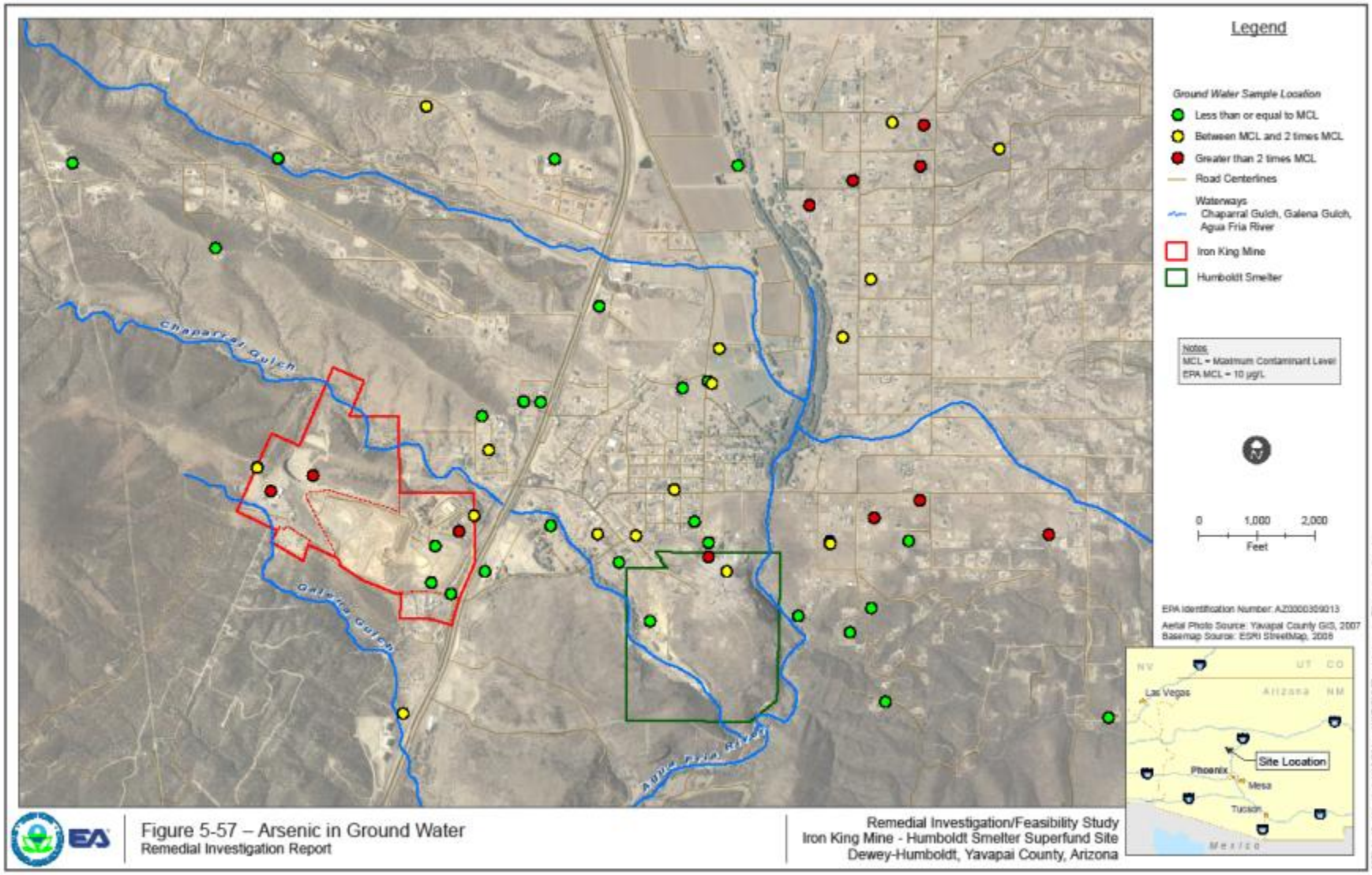
Groundwater

Chloride

Sulfate



Arsenic in Groundwater



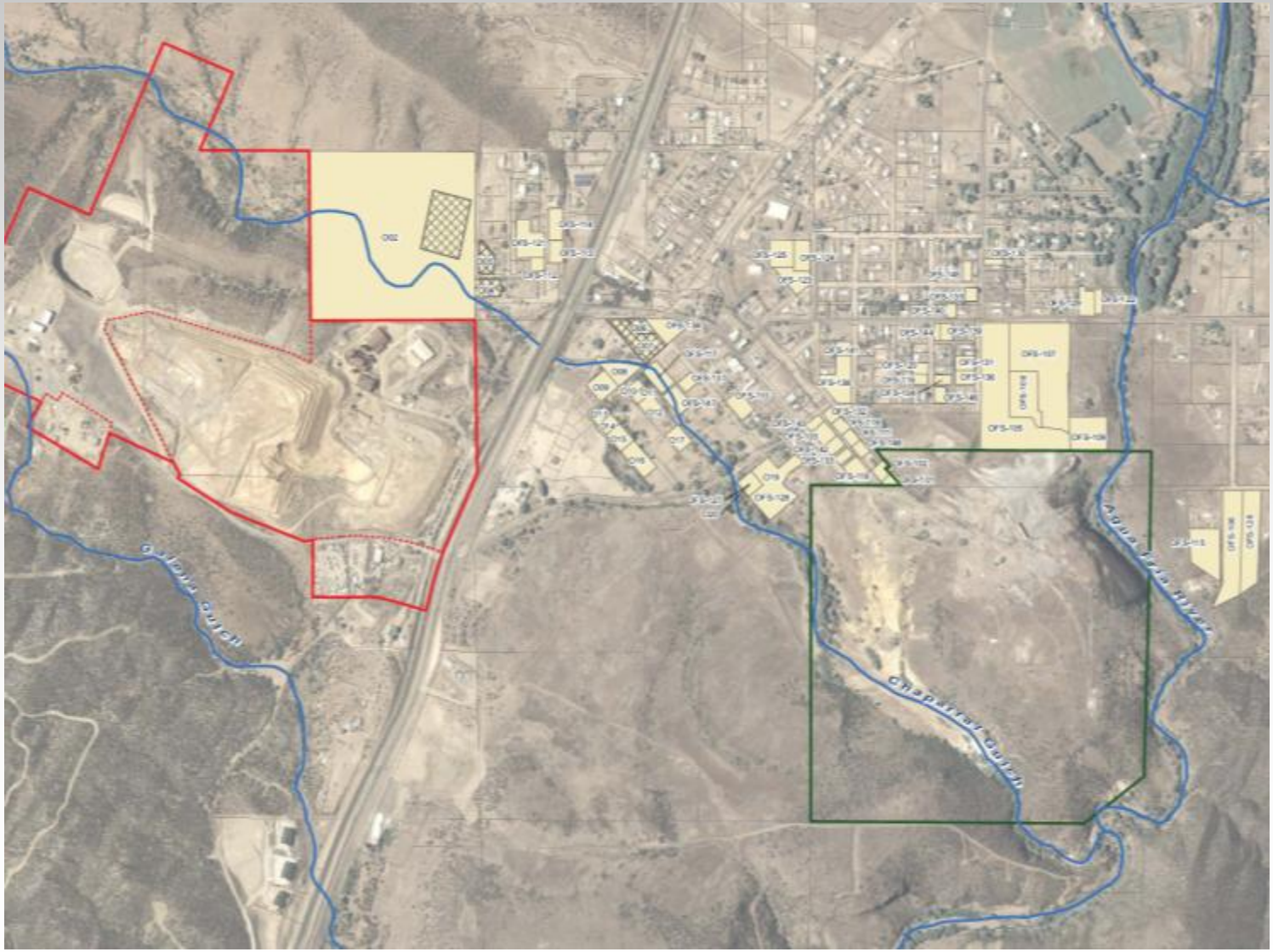
Arsenic in Private Wells

- Exposure over many years above the standard can cause:
  - skin damage, problems with circulatory system, may increase risk of getting cancer

- EPA encourages residents with private wells to sample for arsenic and install treatment systems, if needed.

- List of licensed labs available at the information table

Sampled Residential Areas

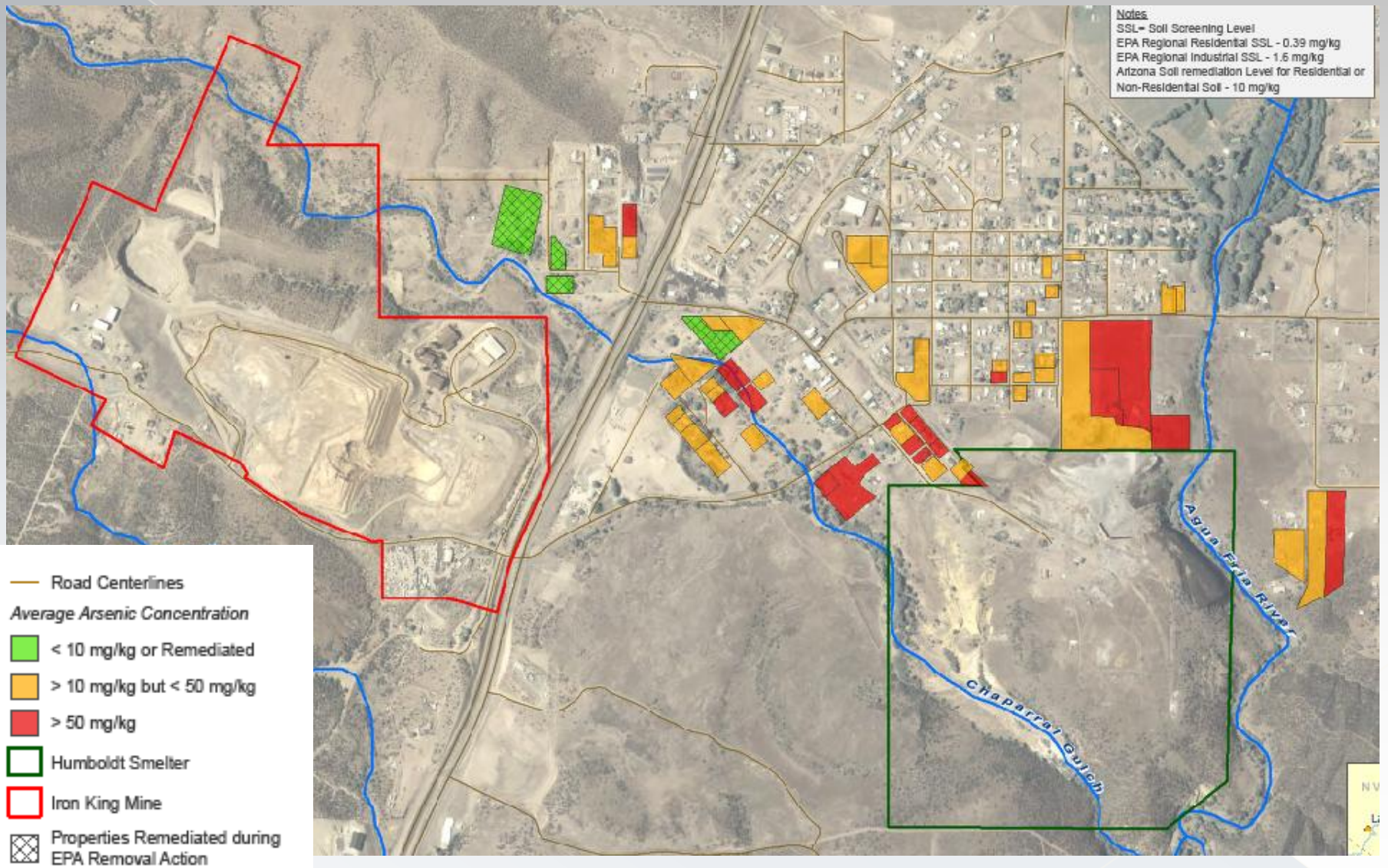


Residential and Public Soils

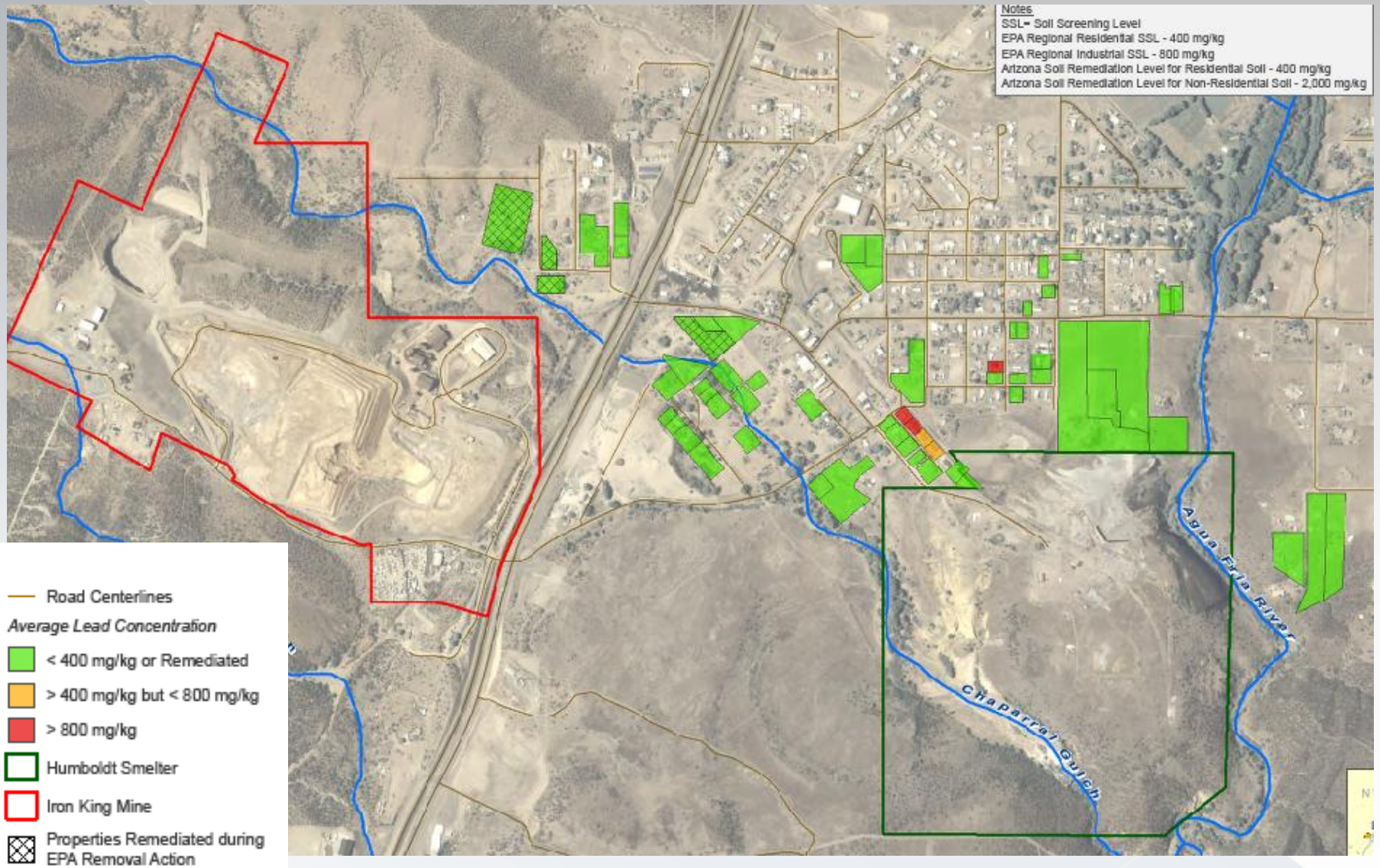
	Arsenic (ppm)	Lead (ppm)
Minimum	1.8	0.37
Maximum	679	4,090
Background	48	79
EPA Screening Level	0.39/22	400
AZ Soil Remediation Level	10	400

- 24 parcels over background arsenic levels
- 44 parcels over background lead levels
- Impacts are primarily limited to the top few inches
- Humboldt Elementary School playground has levels near background.

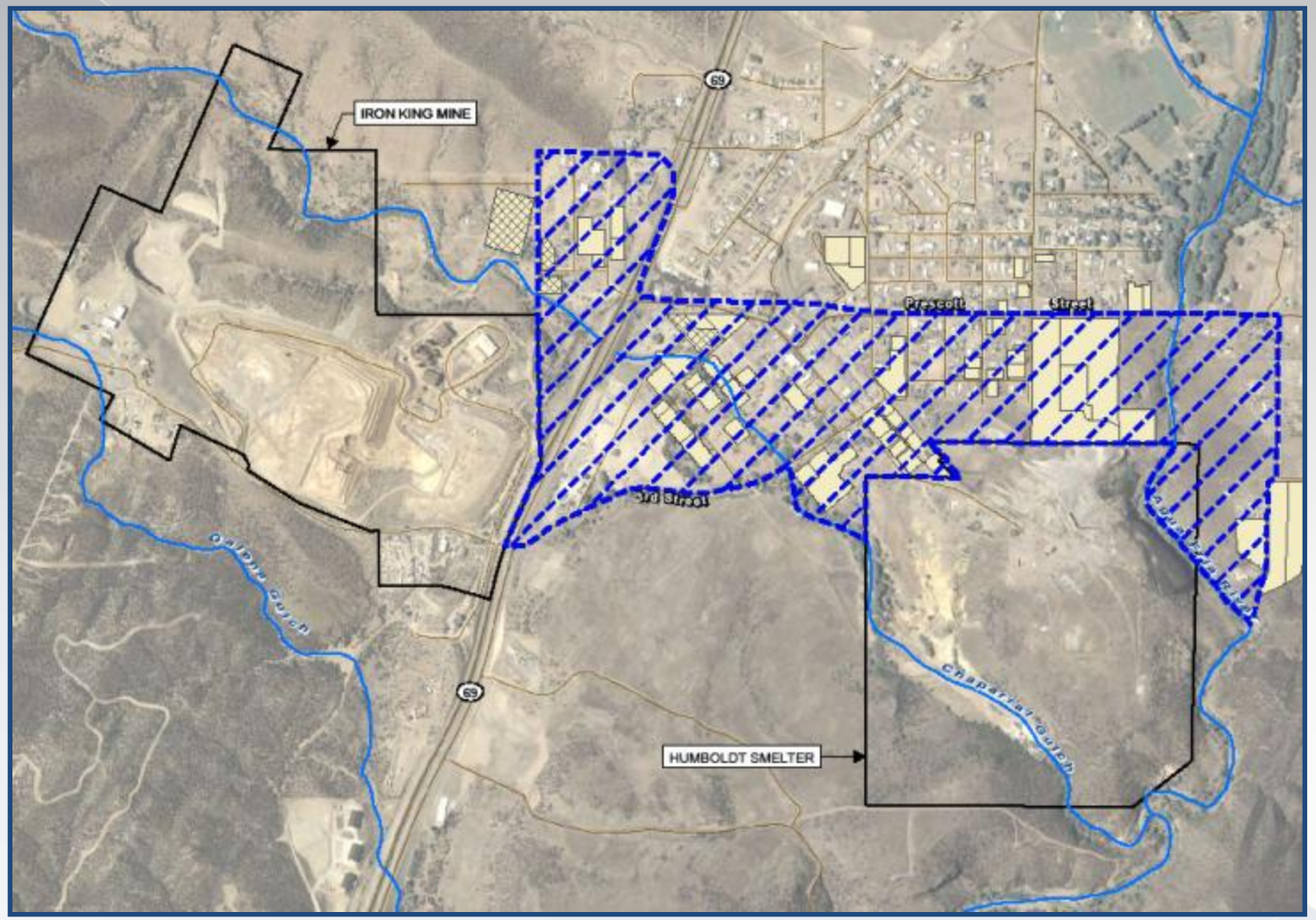
Residential Soils - Arsenic



Residential Soils - Lead



Residential Sampling Area



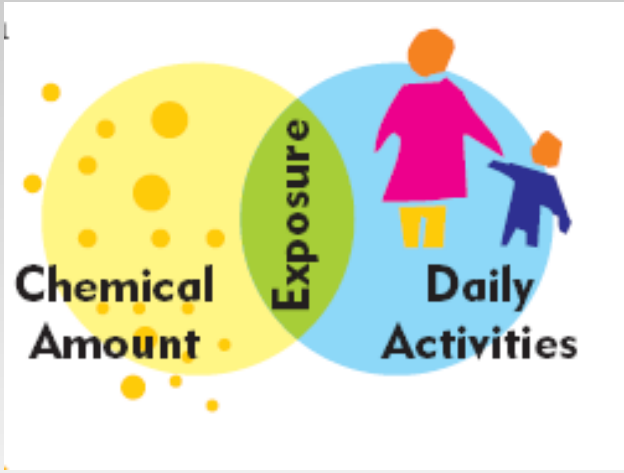
- Please sign up for EPA to sample your yard if you live within the blue area

A Risk Assessment Is:

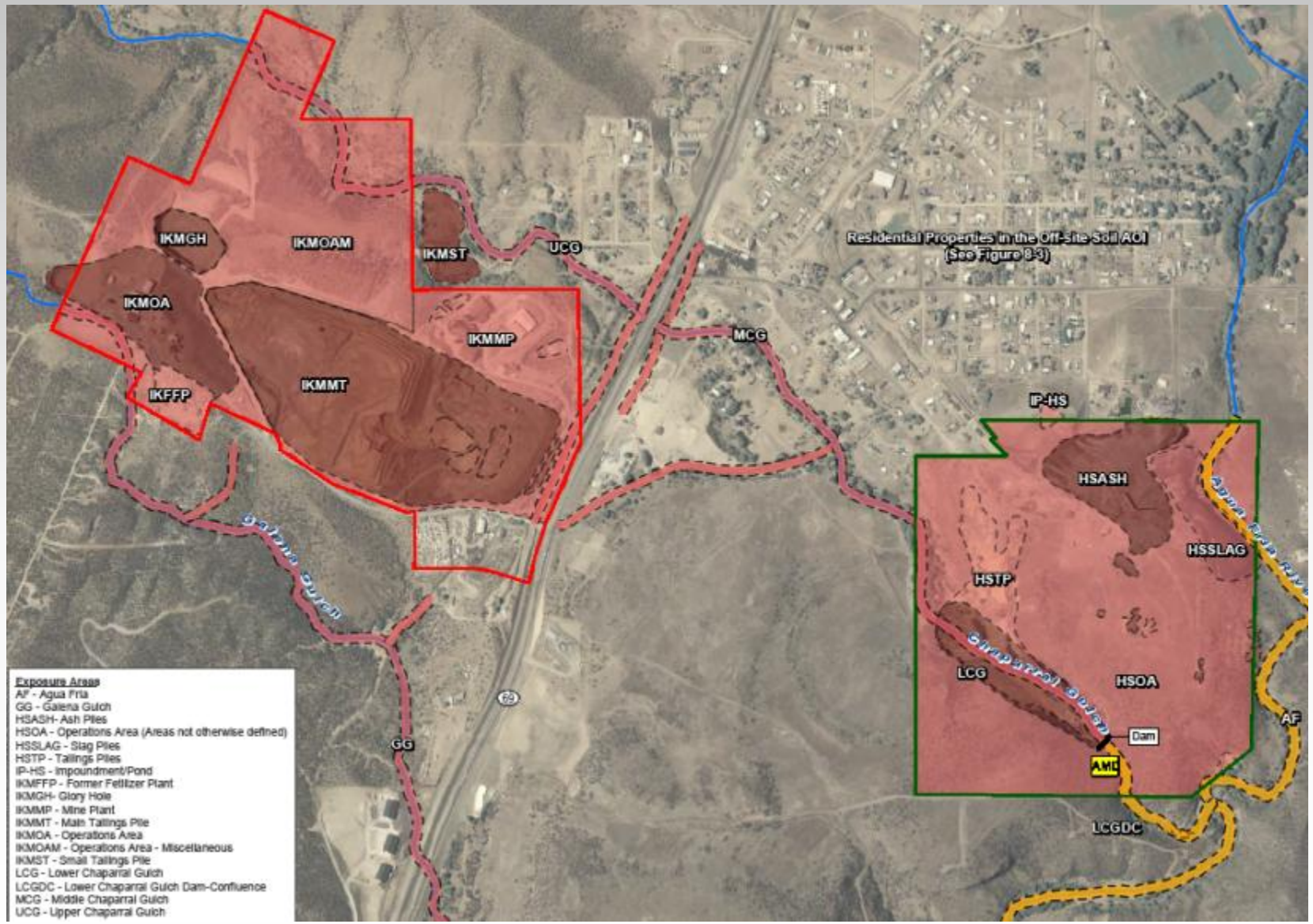
- A comprehensive study of the various ways persons might be in contact with site contamination
- Calculation of how likely it is that human health effects might occur in the **future** because of the contamination
- A way for EPA to determine whether areas need some sort of cleanup action

Risk Assessment Questions

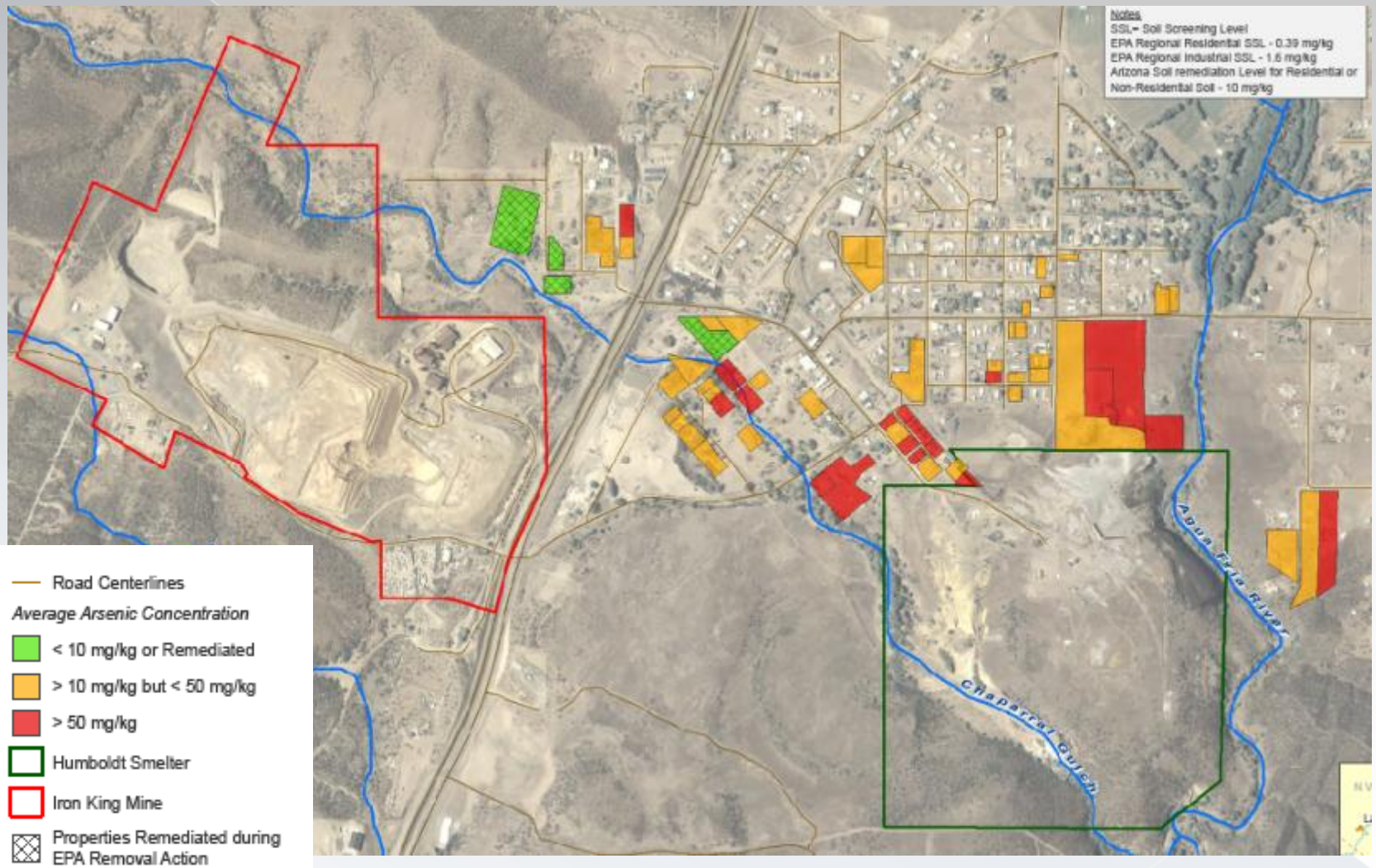
- How are people exposed to site contamination?
- Who is at risk?
- How often are they exposed?
- What is the concentration to which they are exposed?



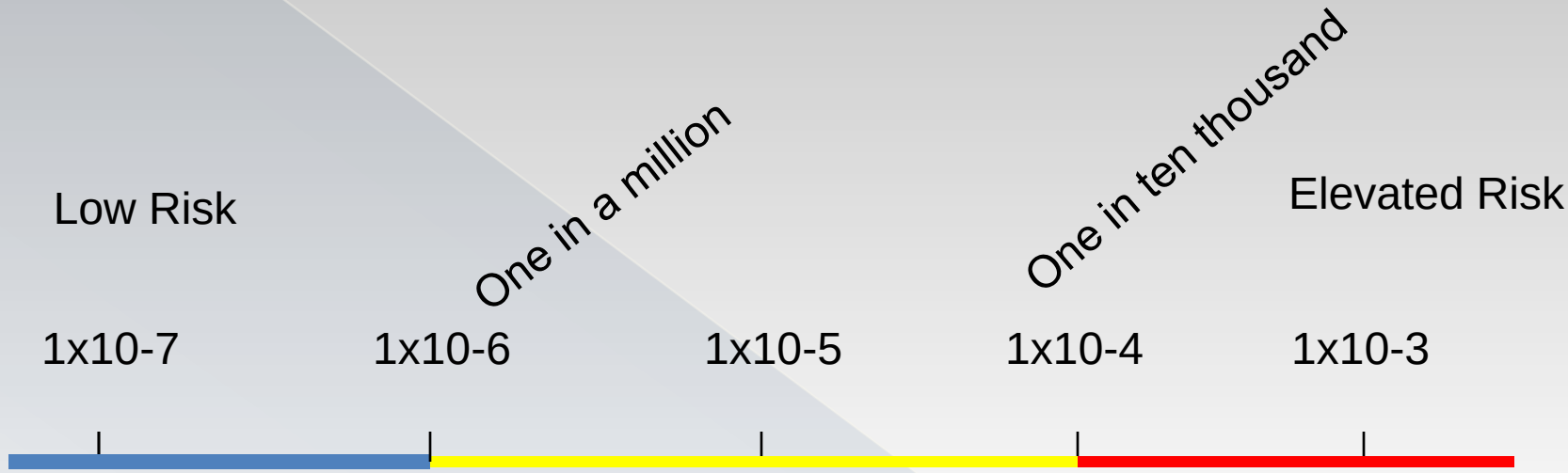
Risk in Source Areas



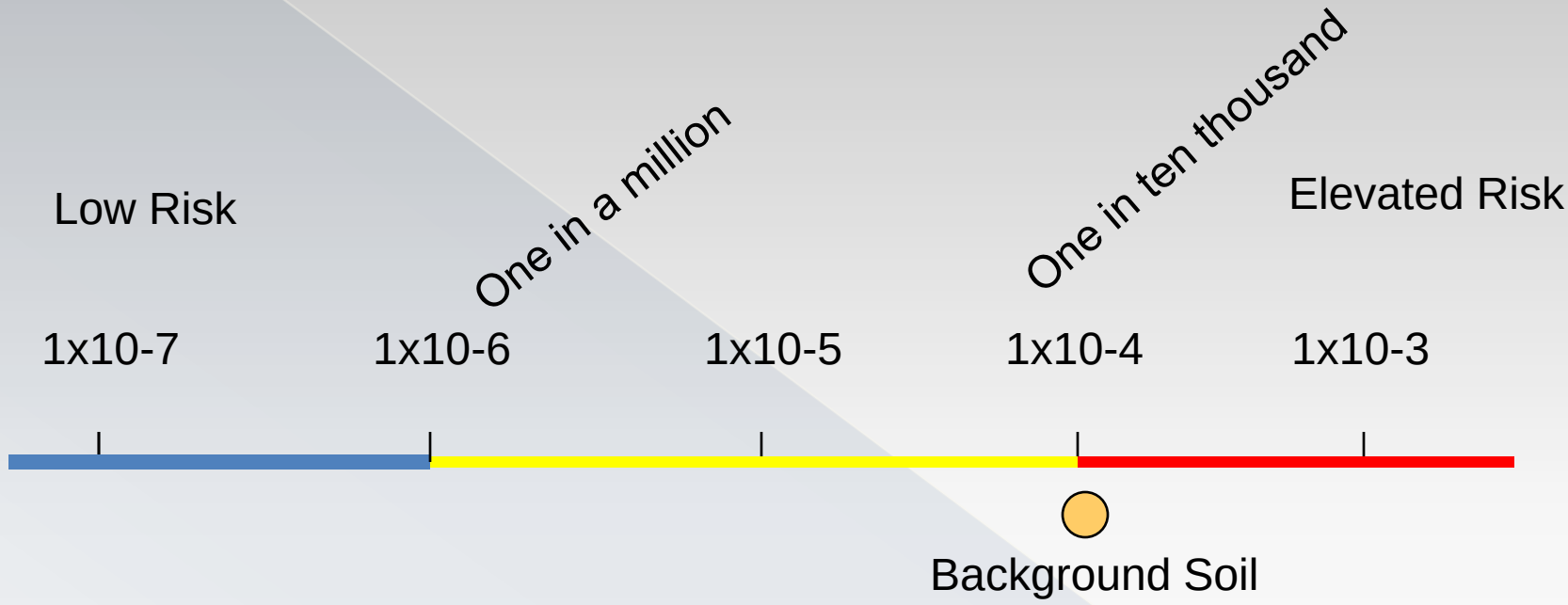
Risks in Residential Areas



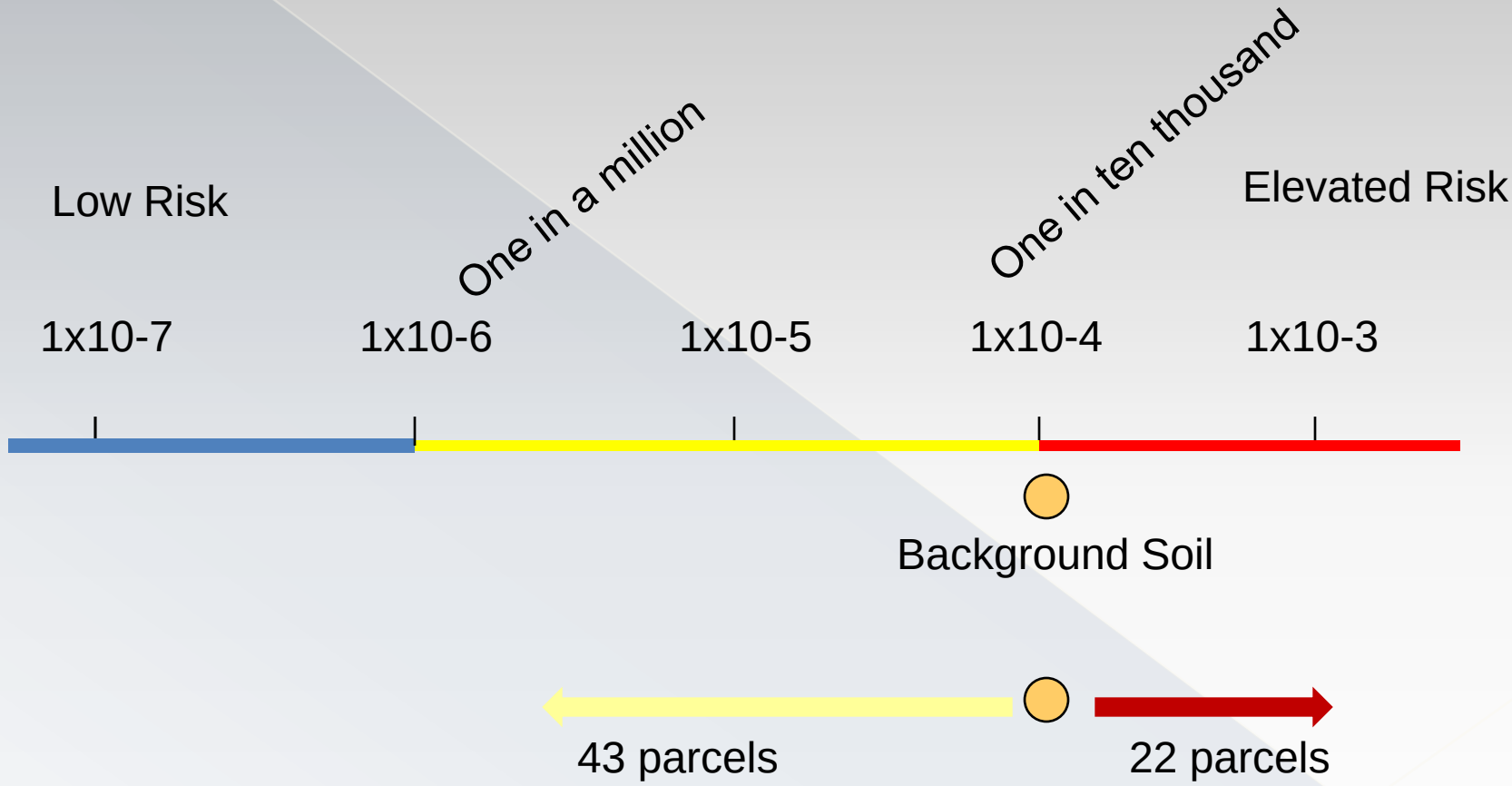
Risk Analysis
Cancer



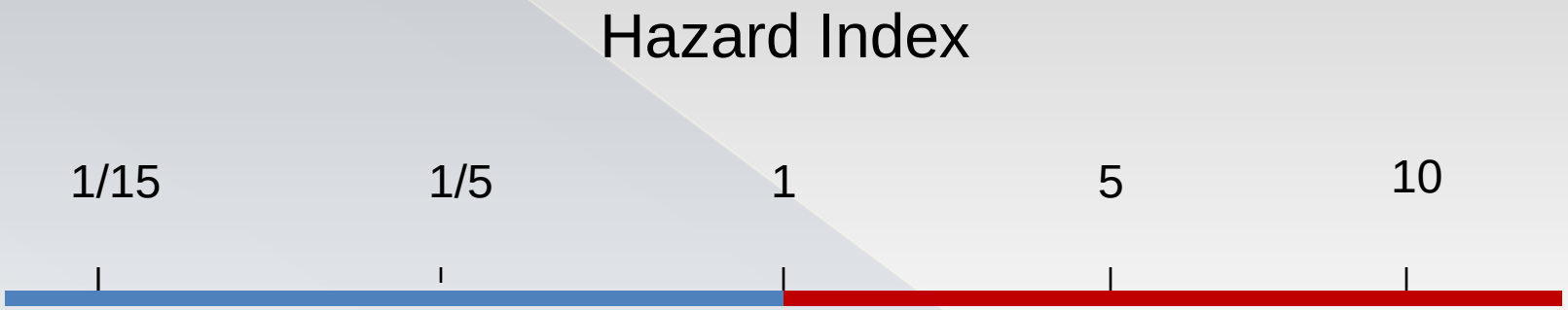
Risk Analysis
Cancer



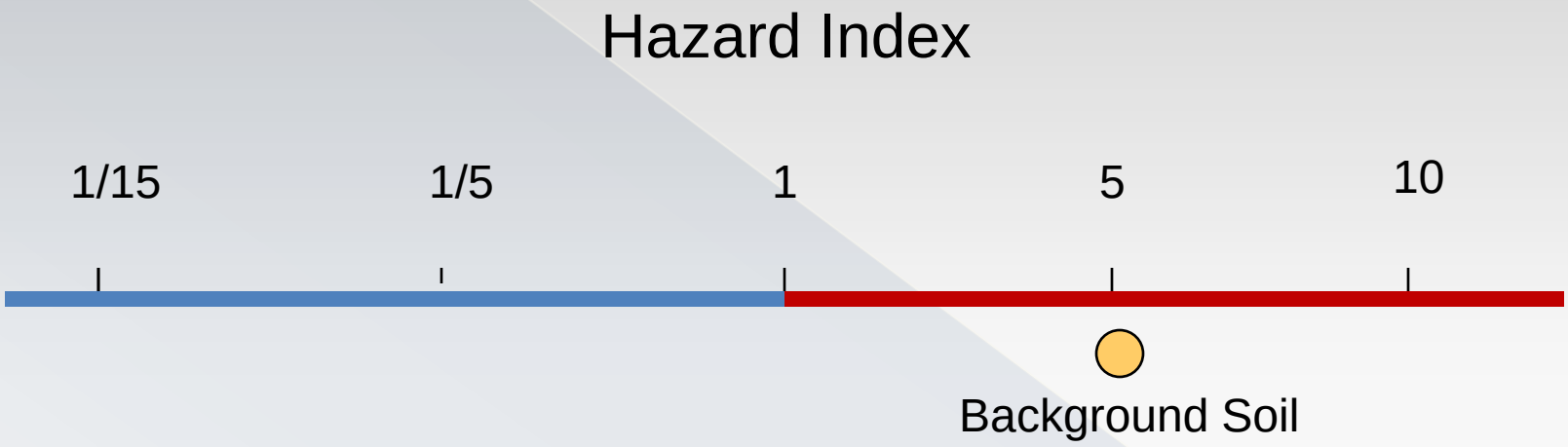
Risk Analysis
Cancer – Residential Soils



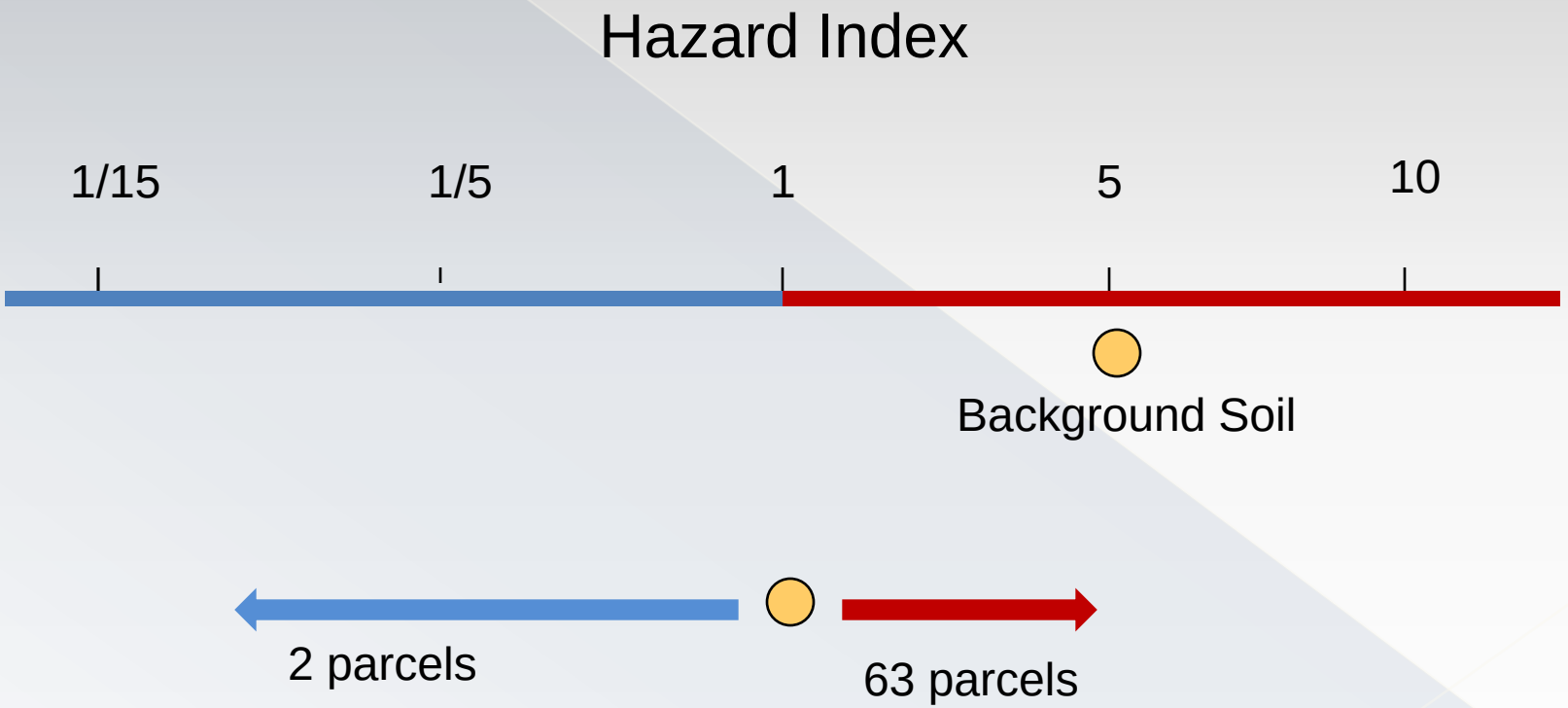
Risk Analysis
Non-Cancer

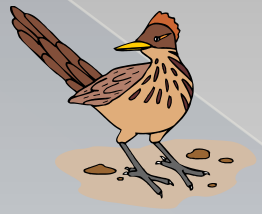


Risk Analysis
Non-Cancer



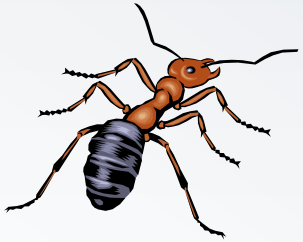
Risk Analysis
Non-Cancer – Residential Soils

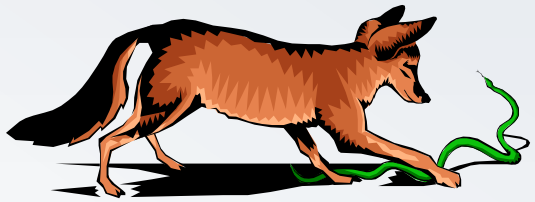




Eco-Risk Assessment

- Iron King Mine and Humboldt Smelter areas pose risks to all ecological groups
  - Terrestrial plants and invertebrates, aquatic and benthic organisms, mammals, birds, reptiles, and amphibians
- Potential risks to ecological groups:
  - Agua Fria River (relatively healthy habitat)
  - In-Town Areas (poor habitat)





Site Timeline

NPL Listing	Remedial Investigation	Feasibility Study	Proposed Plan & Record of Decision	Remedial Design	Remedial Action
Sept 2008	March 2010	Underway	2011	2011-12	2013-15

Site is here

Feasibility Study

- Rank cleanup options based on the following criteria:
  - Protection of human health and the environment
  - Compliance with state and federal requirements
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume
  - Short-term effectiveness
  - Implementability
  - Cost

Proposed Plan

- EPA proposes a preferred cleanup option
- Public comment period & public meeting
- EPA prepares a response to public comments
- Evaluate community and state acceptance of the preferred cleanup option

Next Steps

- Residential yard sampling: May 2nd – 14th
- Private well sampling: May 6th – 13th
- Additional background sampling: May 2nd
- Dust suppression activities for source areas
- Engineering Evaluation: TBD

Until Cleanup Occurs…

- Avoid contact with source areas
- Pay attention to EPA caution signs
- Avoid dust clouds during windy days
- EPA encourages well owners to test their water for arsenic and install treatment devices, if needed

Technical Assistance Grant (TAG)

- Funding for a technical advisor
- $50,000 per grant, can be renewed
- One TAG per Superfund site, managed by a community group
- Ashley Preston has notified EPA of her intent to form a group and apply for the TAG
- Ashley's contact info: dhsmelter@gmail.com

TAG Process

- Multiple groups may want to apply for a TAG
- EPA notifies the community about the TAG request, explains process and identifies deadlines
- 30-day "clock" begins for any group to identify its interest in receiving the TAG to EPA and to work with Ashley on a TAG application
- After the deadline, if other groups wish to submit their own application, EPA notifies the community and starts a second 30-day "clock" for receipt of multiple applications

TAG Process

- EPA will award the TAG to the group that:
  - Best represents the community
  - Shows the highest capacity to manage the TAG and to share information with the community

- TAG information and application forms are located online:

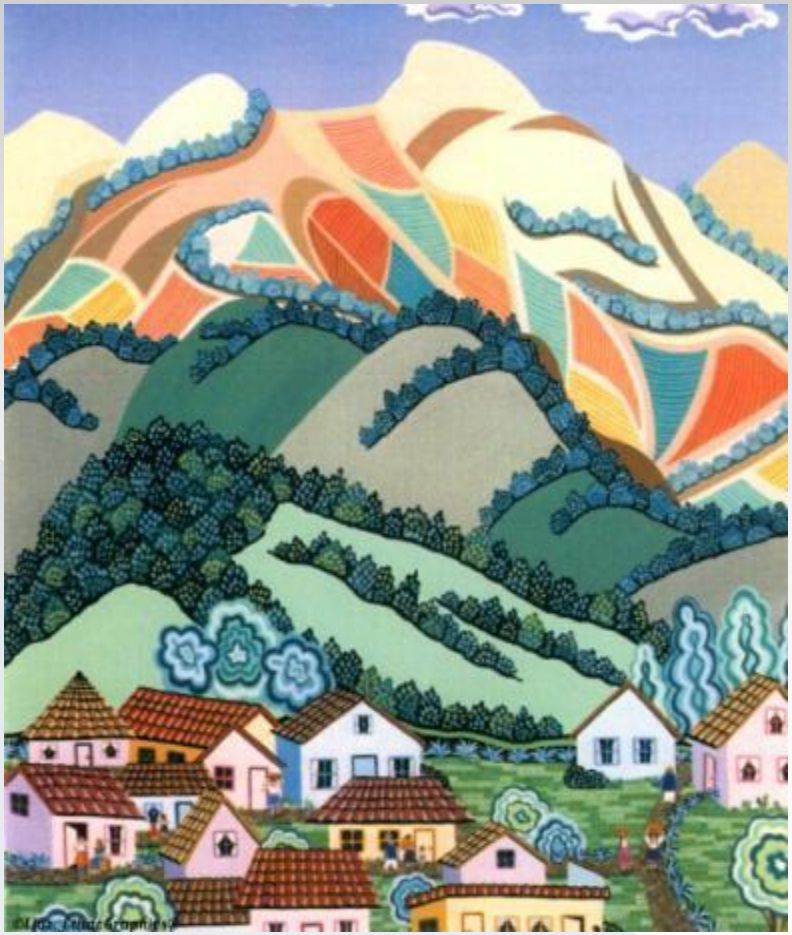
  www.epa.gov/superfund/community/tag/resource.htm

Community Advisory Group (CAG)

- A self-forming community forum that meets regularly to provide input into the cleanup process
- A CAG should include a diverse cross-section of the community, if possible

CAG

- EPA can provide support to the group, such as:
  - renting meeting space
  - advertising CAG meetings
  - providing copies of cleanup documents
  - making presentations on site activities



Community Advisory Group

- Ashley Preston has offered to be a point of contact for those who want to form a CAG
- Ashley's contact info: dhsmelter@gmail.com
- Information about the CAG is located at:

  www.epa.gov/superfund/community/cag/whatis.htm

Community Involvement

- EPA will continue its own Community Involvement Program as identified in the Community Involvement Plan

- EPA's program includes:
  - Public meetings
  - Fact Sheets
  - Documents in the Town Library and on line
  - Notices in the Town Newsletter
  - Presentations to the Town Council
  - Public Notices in local newspapers

Agua Fria Day, 2009

Contact Information

EPA Contacts

Leah Butler
(415) 972-3199
butler.leah@epa.gov

David Cooper
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cooper.david@epa.gov

Toll free: (800) 231-3075

EPA Website:

www.epa.gov/region09/ironkingmine

Iron King Mine and Humboldt Smelter Superfund Site

Arizona Department of Environmental Quality (ADEQ)
Brian Stonebrink, Superfund Project Manager

ADEQ Mission Statement- To Protect Human Health and the Environment

Roles and Responsibilities

- Service the Community & Work with the Town of Dewey-Humboldt
- Attend Dewey-Humboldt Town Council Meetings
- Other Programs - Include Voluntary Remediation Program, Solid Waste, Tanks, Water & Air
- ADEQ works with Community Groups for other Superfund sites and we encourage community participation

Support Role

- ADEQ provides support to EPA
- Our Role is to be the voice for the State's Interests

- ADEQ Website www.adeq.gov
- Site Narrative http://www.azdeq.gov/environ/waste/sps/statesites.html#ironking

Contact Information

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Felicia Calderon
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The University of Arizona Superfund Research Program: Who We Are & What We Do

Monica D. Ramirez, MPA, Research Translation Coordinator
PhD Candidate, Department of Soil, Water and Environmental Science
The University of Arizona
USEPA meeting, Dewey-Humboldt, Arizona, April 27, 2010

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Today's Outline

- Introduction to:
  - The University of Arizona Superfund Research Program
  - Current University of Arizona research at Iron King and Humboldt Smelter Superfund Site
- Introduction to *Gardenroots*
  - Background
  - Objectives
  - Project Design
- How to Join *Gardenroots*

Agua Fria Community Festival, October 10, 2009

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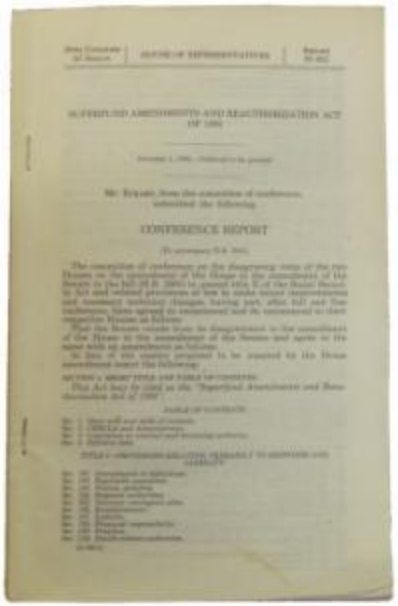
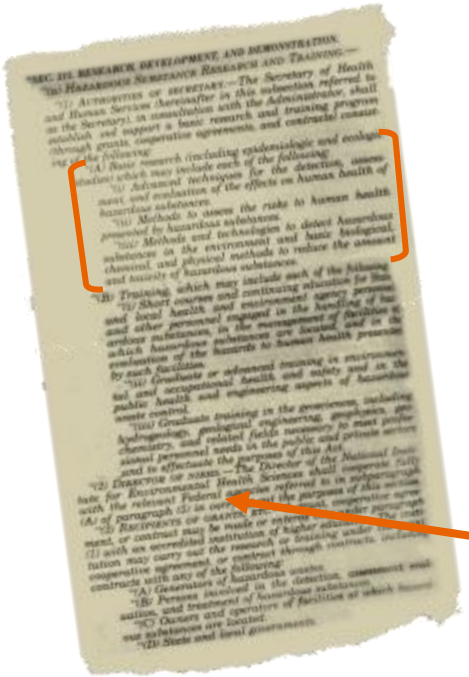
Introduction: Superfund Research Program

- Superfund Amendment Reauthorization Act (1986), section 311(a): calls for creation of university-based research program --> Superfund Research Program





Under direction of National Institute of Environmental Health Sciences

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UA Superfund Research Program

- Mission: Improve Public Health through research and education
  - Explain the relationship between exposure and disease
  - Reduce the uncertainty of risk
  - Develop efficient and cost-effective site assessment and cleanup strategies

- Investigates hazardous waste and public health issues currently confronting the southwestern U.S

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UA SRP Research Efforts at Iron King Mine and Humboldt Smelter Site

As a result of the crushing and grinding (milling) processes, the large pieces of rocks are turned into small particles leading to **Mine tailings:**

- Large piles of crushed rock that are left over after the minerals of interest (lead, zinc, copper, silver, gold, etc.) have been extracted.
- Mine tailings consist of desired metals left behind and unwanted minerals

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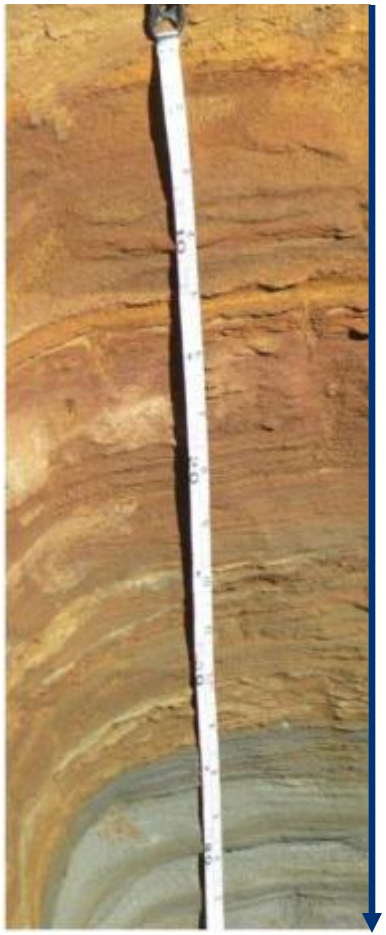
Characteristics of Iron King Tailings - Jon Chorover



0-12 inches down

- Extremely acidic, pH 2.5-4.0
- Water content = 10% - 14%
- Electrical Conductivity = high

12-24 inches down

- Moderately acidic, pH 4.5-6.5
- Water content = 9% - 13%
- Electrical Conductivity = high

Revegetation of the tailings will be challenging due to the conditions above

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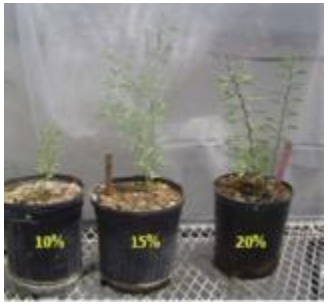
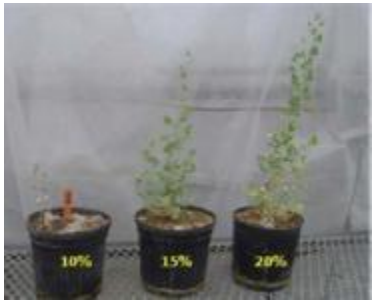
Phytostabilization Potential of the Iron King Mine Tailings - Raina Maier

Phytostabilization = use of plants to cover mine tailings to reduce movement by wind and water

- Greenhouse studies has identified four native plants:



Mesquite



Quail Bush

Catclaw Acacia

Buffalo Grass

- 15% compost is the minimum required to support plant growth
- May 2010 - Field trial begins at Iron King Mine and Humboldt Smelter Superfund Site

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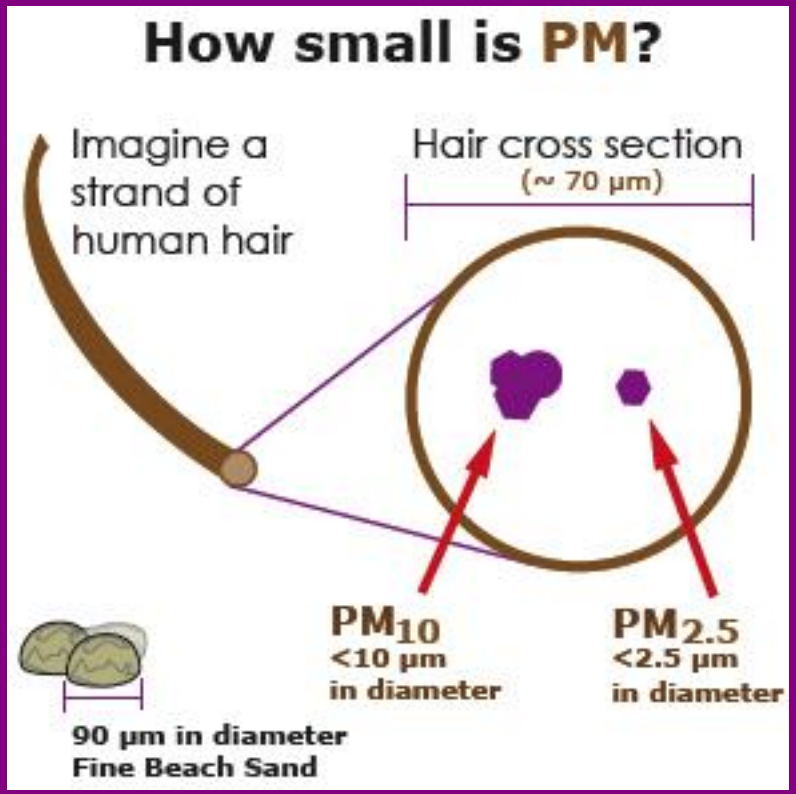
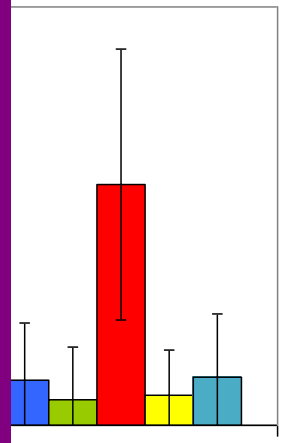
Characterization of Wind Blown Dust - Eric Betterton





Lead

Superfund Research Program

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THE UNIVERSITY OF ARIZONA.
Arizona's First University.

Want to learn more about your garden and soil quality?
Join real-world research and foster connections for sharing ideas and resources

gardenroots

The Dewey-Humboldt, Arizona Garden Project

Monica Ramirez

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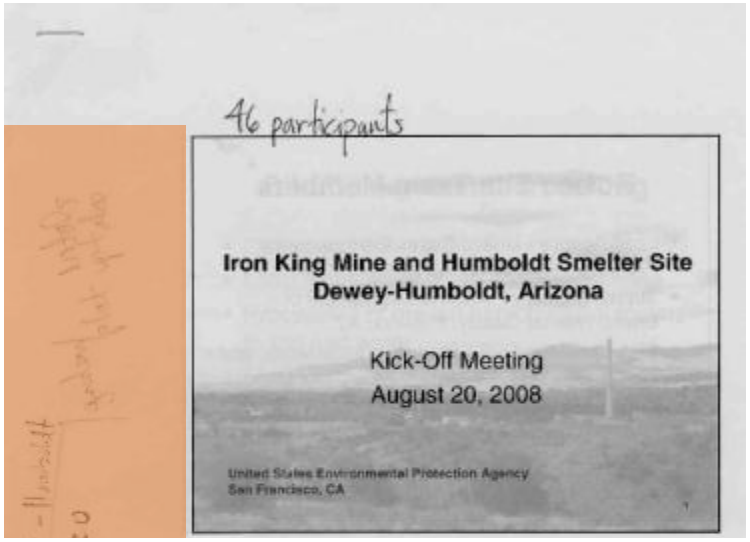
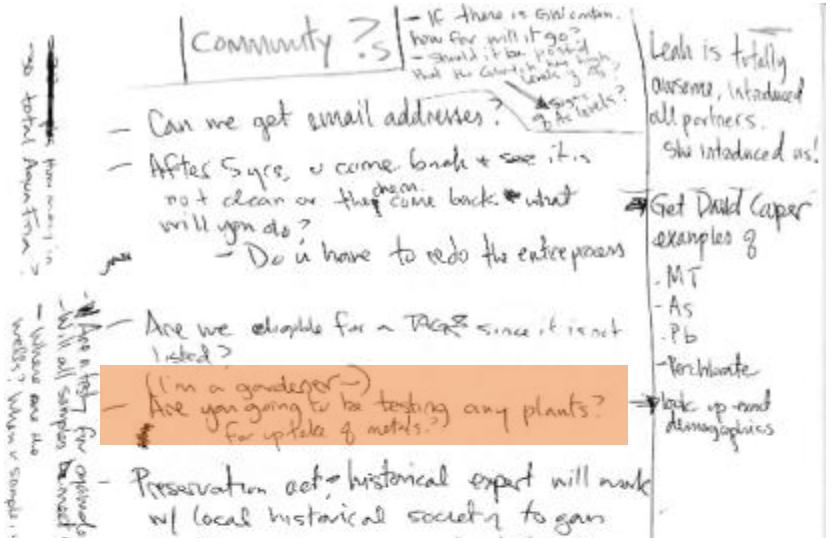
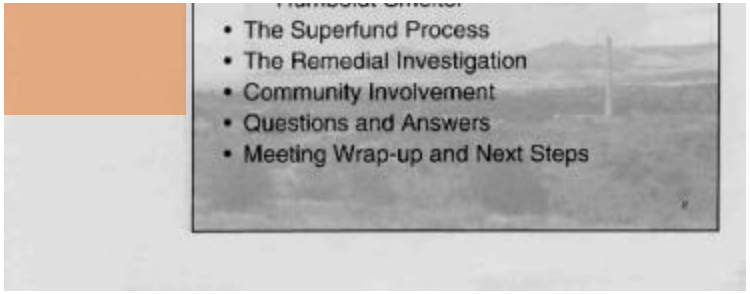
are needed to see this picture.

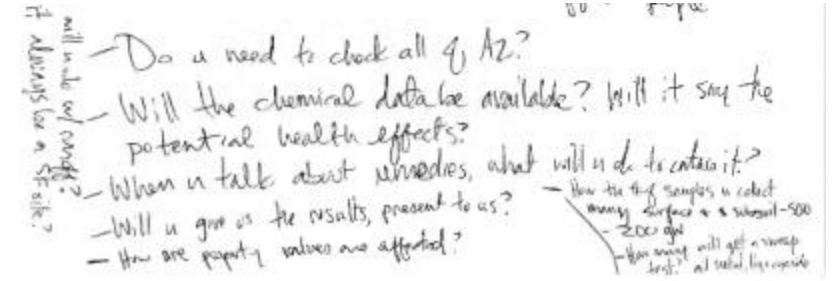
Gardenroots Background





Gardenroots was initiated in response to your research interests





QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Gardenroots Background

- **Build a Citizen Science Program** where gardeners participate in, and contribute to the collection of data while increasing their own personal scientific knowledge

- **Co-design the educational materials** to explain and illustrate the methodology and results of the project to others in community

Definition of Citizen Science -

"A form of science that relates in reflexive ways to the concerns interests, and activities of citizens as they go about their everyday Business."

– Jenkins, 1999

QuickTime™ and a
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are needed to see this picture.

Gardenroots Objectives

- **Together, we will determine:**
  - The metal and nutrient content of the vegetables grown in Dewey, AZ and Humboldt, AZ gardens.
  - The metal and nutrient content of the vegetables grown in the Iron King Mine tailings.
  - Design the educational materials to explain and illustrate the methods and results of the project to others in the community.

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

Gardenroots Project Design

1. Recruit gardeners!
2. Host training sessions and handout sampling toolkit.
3. Citizen scientist's send samples to UA laboratory.
4. UA analyzes samples and hosts "Laboratory Open House" for citizen scientists.
5. Share results and together, begin the co-designing process of educational materials.

Photo source: sunset.com

QuickTime™ and a
TIFF (Uncompressed) decompressor
are needed to see this picture.

How to Join *Gardenroots*?

- Sign up today!
- Call me: 520.260.6620
- Email me: mdramire@email.arizona.edu
- Attend training sessions, first one in July/August 2010 - Sign up today!

Thank You!

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